Exosomes Generated From iPSC-Derivatives: New Direction for Stem Cell Therapy in Human Heart Diseases.

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Funding Grants: Activation of patient-specific endogenous myocardial repair through the exosomes generated from the hypoxic iPSC-derived cardiomyocytes (iCMs).

Public Summary:
Cardiovascular disease (CVD) is the leading cause of death in modern society. The adult heart innately lacks the capacity to repair and regenerate the damaged myocardium from ischemic injury. Limited understanding of cardiac tissue repair process hampers the development of effective therapeutic solutions to treat CVD such as ischemic cardiomyopathy. In recent years, rapid emergence of induced pluripotent stem cells (iPSC) and iPSC-derived cardiomyocytes presents a valuable opportunity to replenish the functional cells to the heart. The therapeutic effects of iPSC-derived cells have been investigated in many preclinical studies. However, the underlying mechanisms of iPSC-derived cell therapy are still unclear, and limited engraftment of iPSC-derived cardiomyocytes is well known. One facet of their mechanism is the paracrine effect of the transplanted cells. Microvesicles such as exosomes secreted from the iPSC-derived cardiomyocytes exert protective effects by transferring the endogenous molecules to salvage the injured neighboring cells by regulating apoptosis, inflammation, fibrosis, and angiogenesis. In this review, we will focus on the current advances in the exosomes from iPSC derivatives and discuss their therapeutic potential in the treatment of CVD.

Scientific Abstract:
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